

ABSTRACT

By implementing reduction in power of common electrode voltages applied from a power source of a liquid crystal drive device to common electrode interconnects of a liquid crystal display panel, respectively, reduction in power consumption of the liquid crystal display panel as a whole is attained.

A VCOM operation waveform in a charging process from a second voltage VCOML to a first voltage VCOMH shows that a charging current I_{cha} represents the sum of a charging current from VCOML to a reference voltage VCI, $I_{cha1} = C_p (VCI - VCOML) / \Delta t$, and a charging current from the reference voltage VCI to the first voltage VCOMH, $I_{cha2} = C_p (VCOMH - VCI) / \Delta t$. Accordingly, power consumed by I_{cha1} is the reference voltage VCI x I_{cha1} , and power consumed by I_{cha2} is VCI x I_{cha2} x 2. Meanwhile, a discharging current at a time of discharging from the first voltage VCOMH to the second voltage VCOML is the sum of a discharging current from the first voltage VCOMH to the ground potential GND, $I_{dis1} = C_p (VCOMH - GND) / \Delta t$, and a discharging current from the ground potential GND to the second voltage VCOML, $I_{dis2} = C_p (GND - VCOML) / \Delta t$. Now, if converted in terms of power consumed at the reference voltage VCI, since I_{dis1} represents discharge to GND, power consumption thereby becomes zero. Then, consumed power due to the discharging current from the ground potential GND to the second voltage VCOML, I_{dis2} , is VCI x I_{dis2} .